

HW ANSWERS:

$$(14) \hat{p}_{Pr} = 35/49 \quad \hat{p}_{Pl} = 32/44$$

STATE

- 2 indep. SRS

$$\begin{aligned} & n_{Pr} \hat{p}_{Pr} \\ & n_{Pr} \hat{q}_{Pr} \geq 10 \\ & n_{Pl} \hat{p}_{Pl} \\ & n_{Pl} \hat{q}_{Pl} \end{aligned}$$

$$\text{pop}_{Pr} \geq 10 * n_{Pr}$$

$$\text{pop}_{Pl} \geq 10 * n_{Pl}$$

CHECK

- stated random samples, assumed people taking each med are indep.

$$\begin{aligned} & - 35 \\ & 14 \geq 10 \\ & 32 \\ & 12 \end{aligned}$$

- there are more than 490 people studied who would take Prozac and more than 440 studied who would take the placebo.

Conditions met -> Normal Model -> 2 prop Z interval

(b)

$$(0.7143 - 0.7273) \pm (1.96) \sqrt{\frac{(0.7143)(0.2857)}{49} + \frac{(0.7273)(0.2727)}{44}}$$

$$= (-0.1955, 0.16954)$$

We are 95% confident that the true difference in the percent of people who felt healthy and took Prozac vs. the placebo was between -19.55% and 16.954%.

(c) Since 0 is in the interval, we have evidence to say that there is no difference between taking Prozac or the placebo. Therefore we do not think that Prozac is effective.

$$(18) \hat{p}_N = 67/361$$

$$\hat{p}_D = 26/89$$

(a) prospective study

(b) $H_0: p_N = p_D$

$H_a: p_N < p_D$

(c) STATE

- 2 indep. SRS

$$\begin{matrix} n_N \hat{p}_N & n_N \hat{q}_N \\ n_D \hat{p}_D & n_D \hat{q}_D \end{matrix} \geq 10$$

- $pop_N \geq 10 * n_N$

$pop_D \geq 10 * n_D$

CHECK

- assumed representative samples
and people with/without depression are
indep.

- 67, 294, 26, 63 ≥ 10

- there are more than 3610 cardiac
patients who have no depression
and more than 890 cardiac patients
with depression.

Conditions met --> Normal model --> 2 prop Z test

$$(d) \quad z = \frac{0.1856 - 0.2921}{\sqrt{\frac{(0.2067)(0.7933)}{361} + \frac{(0.2067)(0.7933)}{89}}} = -2.223$$

$$P(Z < -2.223) = 0.0131$$

We reject H_0 b/c p-value of $0.0131 < \alpha = 0.05$.

We have sufficient evidence that among cardiac patients, the percent who die and have depression is higher than the percent who die and do not have depression.

(e) p-value = the probability of getting our sample (or something more extreme) if the claim is true.

There is a 1.3% chance of getting a sample where the difference in the % of cardiac patients dying with and without depression is 10.65% or more (if there are really the same % of patients dying with and without depression).

(f) Our conclusion = reject H_0

If we are wrong, we would have rejected H_0 , when H_0 is true. This is a **TYPE I ERROR**.